

REMARKS

In the foregoing amendments, claims 40-44 were amended to better define the invention. The amendments to these claims include further defining supplying the gas mixture from a gas supply means, supplying xenon gas from the gas or xenon supply means, and carrying out pulse oscillation by discharge across discharge electrodes. Claims 45-48 were added to the application, which define that the gas supply means includes an xenon sensor means for detecting an amount of xenon within the chamber device, and a controller for controlling the amount of xenon supplied to the chamber device based on the detected amount of xenon in the chamber device by the xenon sensor means. Claims 49-52 were added to the application, which define that the rare gas is Kr. Accordingly, claims 40-52 are in the application for consideration by the examiner at this time.

Claims 40-44 were rejected under 35 U.S.C. § 112, second paragraph. The Official action stated that claims 40-44 are incomplete for omitting essential structure cooperative relationships of elements, such omission amounting to a gap between the necessary structural connection, citing M.P.E.P. § 2172.01. The Official action continued that the omitted structure has to do with how a mechanism or chamber is positioned relative to one another in an excimer laser and that other omitted elements include gas supply units, mirror(s), window(s), discharge electrodes, and the device(s) used to maintain the predetermined concentration of gas mixture.

Applicant respectfully submits that the positions set forth in the outstanding Office action are misplaced and incorrect. As explained in applicants previously filed response on June 26, 2003, section 2172.01 of the M.P.E.P. has to do with unclaimed essential subject matter under the first paragraph of 35 U.S.C. § 112. Essential subject matter to a claimed invention is subject matter necessary to set forth the novelty of the invention. The items listed as missing from the claims in the outstanding Office action are not necessary subject matter for the patentability of the presently claimed invention and, therefore, not essential items. The items, such as mirrors, electrodes, etc., mentioned in the Office action are conventional items on which the patentability of the presently claimed invention does not rest. Since these items are not necessary for the novelty of the presently claimed invention, there is no need to include these items in the claims in order to comply with either the first or second paragraph of 35 U.S.C. §112. Along these lines, applicant respectfully submits that it is well established in the case law that applicant can claim subcombinations or only parts of structures. As explained in *Carl Zeiss Stiftung v. Renishaw PLC*, 945 F.2d 1173, 20 USPQ2d 1094 (Fed. Cir. 1991), "[I]t is entirely consistent with the claim definiteness requirement of the second ¶ of §112, to present 'subcombination' claims, drawn to only one aspect or combination elements of an invention...." As stated in *Personalized Media*

Communications, LLC v. U.S. Int'l Trade Comm'n, 156 F.3d 1351, 48 USPQ2d 1351 (Fed. Cir. 1991):

Determining whether a claim is definite requires an analysis of 'whether one is skilled in the art would understand the bounds of the claim when read in light of the specification.... If the claims read in light of the specification reasonably apprise those skilled the art of the scope of the claims, §112 demands no more.' *Miles Laboratories, Inc. v. Shandon, Inc.*, 997 F.2d 870, 27 USPQ2d 1123 (Fed. Cir. 1993), *cert. denied*, 510 U.S. 1100 (1994).

With the above in mind, applicant respectfully submits that claims 40-52 particularly point out and distinctly claim the subject matter regarded as applicant's invention within the meaning of 35 U.S.C. § 112, second paragraph. Therefore, applicant respectfully requests that the examiner reconsider and withdraw this rejection.

In addition, attention is respectfully directed to the claims of U.S. patent No. 6,014,398 of Hofmann *et al.* (Hofmann). This patent was used elsewhere in the Official action in a prior art rejection of applicant's claims. The claims in this patent simply define a laser chamber comprising two elongated electrodes, at least one preionizer, and a laser gas. These claims do not include gas supply units, mirror(s), window(s), discharge electrodes, and the device(s) used to maintain the predetermined concentration of gas mixture that were alleged as missing in applicant's claimed invention. The omission of the elements from the claims of Hoffman demonstrates that they are not necessary for a proper understanding of the claims therein and, more importantly, they are not necessary to particularly point out and distinctly claim the subject matter

regarded as the invention within the meaning of 35 U.S.C. §112, second paragraph. Therefore, it is not understood why such elements are believed to be necessary in applicant's claims. In addition, it is respectfully noted that in the foregoing amendments to applicant's claims, claims 40-44 were amended to include additional structures, such as, gas supply means for supplying the gas mixture, xenon supply means for supplying xenon gas, and carrying out pulse oscillation by discharge across discharge electrodes.

For all the aforesaid reasons, applicant respectfully submits that the claims in this application particularly point out and distinctly claim the subject matter regarded as the invention within the meaning of 35 U.S.C. §112, second paragraph. Therefore, applicant respectfully requests that the examiner reconsider and withdraw this rejection.

Claims 40-44 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. patent No. 6,014,398 of Hofmann *et al.* (Hofmann). The statement of this rejection is set forth from the bottom of page 3 through page 4 of the Official action. Applicant respectfully submits that the teachings of Hoffman do not disclose or suggest the invention as set forth in new claims 40-52 within the meaning of 35 U.S.C. § 102 or 35 U.S.C. § 103.

Applicant respectfully submits that the teachings of Hoffman do not disclose every aspect of the invention as set forth in the present claims and, therefore, cannot anticipate the presently claimed invention within the meaning of 35 U.S.C. § 102. Accordingly, the teachings of Hoffman can, at best, only be

used to reject applicant's claims under 35 U.S.C. § 103 based on obviousness. However, applicant respectfully submits that any rejection based on obviousness over the teachings of Hoffman is rebutted and overcome by the unexpected advantages achieved by the presently claimed invention. Namely, the amounts of xenon gas in the laser gas mixture as presently claimed provides unexpected advantages and/or results over the teachings of Hoffman, applicant respectfully submits that the presently claimed invention is distinguishable from these teachings within the meaning of 35 U.S.C. § 103.

A. The teachings of Hoffman do not anticipate applicant's claimed invention.

The teachings of Hoffman never explain how xenon is supplied to the laser chamber. Therefore, these teachings cannot anticipate a device or method where (firstly) a gas mixture is supplied to a chamber device from gas supply means, and (secondly) xenon gas is supplied to the gas mixture in the chamber device, as required in claims 40 and 42. Claim 42 further requires that the gas mixture is sealed in the chamber device before xenon gas is supplied to the chamber device. Similarly, the teachings of Hoffman cannot anticipate a device or method where (firstly) the gas mixture is supplied to gas supply means, (secondly) xenon gas is supplied from xenon gas means and mixed with the gas mixture within the gas supply means, and (thirdly) the gas mixture is supplied to the chamber device and sealed in the chamber device, as required in claim 41 and 44. The teachings of Hoffman also do not anticipate a

method including a concentration sensing step for detecting the concentration of xenon, as required in claim 43.

New claims 45 and 46 are excimer laser claims and new claims 47 and 48 are method claims that require the gas supply means includes an xenon sensor means for detecting an amount of xenon within the chamber device, and a controller for controlling the amount of xenon supplied to the chamber device based on the detected amount of xenon in the chamber device by the xenon sensor means. The teachings of Hoffman do not anticipate this structure or a method of using this structure.

New claims 49-52 all require the combination of a gas mixture where the rare gas is Kr and approximately 10 ppm of xenon gas in the laser gas mixture for maximizing output energy of oscillated pulsed laser and minimizing dispersion of the output energy of the oscillated pulsed laser. With respect to KrF lasers, Hoffman proposes about 30 ppm of Xe, as explained below. For this reason, the teachings of Hoffman cannot anticipate the invention set forth in claims 49-52.

In summary, since the teachings of Hoffman do not explain how xenon is supplied therein, these teachings cannot contemplate or suggest a specific sequence of supplying xenon gas to the gas mixture in the laser device, as required in the present claims 40-44. For similar reasons, the teachings of Hoffman do not contemplate or suggest the use of a gas sensor means for detecting an amount of xenon in the chamber device by the xenon sensor

means or the other structures set forth in claims 45-48. Finally, the teachings of Hoffman cannot anticipate the invention set forth in claims 49-52, which are the combination of KrF lasers and about 10 ppm of Xe.

B. The teachings of Hoffman do not appreciate the importance and significance of the presently claims amounts of xenon.

The teachings of Hofmann propose at column 7, line 30, that "The energy is lower with Xe over the entire range." See Fig. 8B of Hoffman. Fig. 8A of Hoffman shows a laser output exhibits a tendency of decrease with addition of Xe. These teachings in Hoffmann are opposite to the presently claimed invention, where energy output is maximized at about 10 ppm Xe in the laser gas. Furthermore, these teachings and Hoffman are completely silent with respect to minimizing energy dispersion at about 10 ppm Xe in the laser gas, as required in I paid monthly is a silicone which your priority data is applicant's claims.

The most pertinent teachings of Hoffman concerning amounts of xenon appear at three different portions thereof. These include the following discussions:

(1) Column 2, lines 33-34:

Tests performed show substantial improvements in energy stability with the addition of about 30 ppm of Xenon to a KrF laser. Tests show improved performance for the ArF lasers with the addition of about 6-10 ppm of Xe or 40 ppm of Kr.

(2) Column 9, lines 45-49:

Without the additives the average 3 sigma for the laser was about 5 %. About 6-10 ppm of Xe reduced 3 sigma to above for 4% (a 20% improvement). For the same improvement with Kr about 40 ppm were required.

(3) Column 10, lines 27-30:

Recommended ranges of Xe for KrF lasers is less than about 30 to 40 ppm. Recommended ranges of Kr for ArF lasers is less than about 40 ppm and recommended Xe ranges is less set about 10 ppm.

These discussions in the teachings of Hofmann do not contemplate or suggest an excimer laser output control method used in an excimer laser, where the xenon contained within the gas mixture in an amount of about 10 ppm both maximizes an output energy of the oscillated pulsed laser and minimizes a dispersion of the output energy of the oscillated pulsed laser, as required in the present claims.

C. The use of approximately 10 ppm of Xe gas in the laser gas mixture as required in the present claims provides unexpected advantages over the teachings of Hoffman.

In particular, the present applicant discovered that approximately 10 ppm of Xe gas in the laser gas mixture is effective for actually increasing energy of the laser output. See Fig. 3 of the present application. This is surprising and unexpected in view of the teachings of Hoffmann. All of the present claims in the application define either a method step or structure for controlling the concentration of xenon gas in the laser gas mixture to an amount of

approximately 10 ppm, which amount effectively reduces the bursting and spiking phenomena in the pulsed laser output while also increasing energy of the pulsed laser output.

As shown in Fig. 3 of the present application, the applicants have discovered the point that the laser output be a comes maximum and the point that a dispersion of the output energy becomes a minimum are both with the addition of 10 ppm of Xe. The teachings of Hoffman do not contemplate or suggest achieving both maximum output and minimum dispersion at 10 ppm of Xe, as opposed to other amounts of Xe, such as the amounts of 6 and 40 ppm proposed therein. For example, Fig. 8A of Hoffman shows that the laser output is gradually decreased in proportion to the increase in the concentration of Xe. Applicant respectfully submit that the discovery of maximum output and minimum dispersion of the laser by use of about 10 ppm of Xe in the laser gas mixture is unexpected, and thus unobvious from the teachings of Hoffman.

Applicant respectfully submits that the showing of improved properties as shown in Fig. 3 of the present application concerning the maximum output and a minimum dispersion using about 10 ppm of xenon in the laser gas demonstrates substantially and unexpectedly improved results, which are described in applicant's specification as remarkable. Therefore, applicant respectfully submits that the showing in Fig. 3 of the present application and the statements in the present specification are sufficient to establish unexpected results and thereby distinguish the presently claimed invention

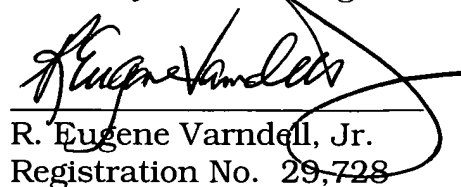
from the teachings of Hoffman, as explained in *In re Soni*, 54 F.3d 746, 34 USPQ2d 1664 (Fed. Cir.1995)

For the foregoing reasons, applicant respectfully submits that the teachings of Hoffmann cannot contemplate or suggest the invention as set forth in claims 40-52 within the meaning of 35 U.S.C. § 102 or 35 U.S.C. § 103. Therefore, applicant respectfully requests that the examiner reconsider and withdraw any and all rejections of the claims set forth in the Official action mailed July 16, 2003, and allow present claims 40-52 in the application.

In view of the foregoing amendments and remarks, favorable consideration and allowance of claims 40-52 are respectfully requested. While it is believed that the present application is in condition for allowance, should the examiner have any comments or questions, it is respectfully requested that the undersigned be telephoned at the below-listed number to resolve any outstanding issues.

In the event this paper is not timely filed, applicant hereby petitions for an appropriate extension of time. The fee therefor, as well as any other fees which may become due, may be charged to our deposit account No. 22-0256.

Respectfully submitted,
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